Section 2: STUDY PURPOSE

The purpose of the ATP Trail Study is to identify a preferred corridor for a multi-use trail facility that would enhance the active transportation[1] network in the Richmond region[2], by improving bicycle and pedestrian safety, expanding non-motorized travel choices, and providing increased system linkage and connectivity to population centers, as well as key local and regional destinations, consistent with state, regional, and local transportation planning initiatives.

In support of this study, the following need elements have been identified for the project:

- ***Safety –*** Based on recent crash data, there is a demonstrated need to provide safer facilities at low stress levels to accommodate local and regional trips using active transportation modes, particularly bicycle and pedestrian modes.
- ***Connectivity*** – The network of facilities dedicated to active transportation is limited and incongruous in the study area. Improved connectivity is needed to link existing bicycle and pedestrian facilities, population centers, and key destinations for work, school, or recreation; therefore, encouraging increased use of active transportation modes.
- ***Consistency with State, Regional, and Local Transportation Planning –*** State, regional, and local transportation plans throughout the Richmond region prioritize active transportation projects; there is a need to support the development of a transportation network that is consistent with these planning efforts.

Documentation of the data and information supporting the identification of these need elements are summarized in the sections that follow.

NEED ELEMENT 1: Safety

Summary: Most bicycle and pedestrian crashes within the study area occur on roadways with wide shoulders or "share the road" signage and marked bicycle lanes immediately adjacent to general purpose traffic. As discussed below, the number of crashes and characteristics of where they occur indicate that there is a need for improvements of the active transportation network to incorporate safer bicycle, pedestrian, and other active transportation facilities. Further, VDOT has developed a *Pedestrian Safety Action Plan (PSAP)*[3] which aims to reduce pedestrian fatalities throughout the Commonwealth by evaluating at-risk locations and solutions to improve pedestrian safety.

According to the U.S. Department of Transportation's (USDOT) National Highway Traffic Safety Administration (NHTSA) and the Virginia statewide Crash Analysis Tool, maintained by VDOT's Traffic Engineering Division (TED), there have been 8,586 pedestrian and bicyclist (pedalcyclist[4]) crashes in Virginia over the past three years (November 1, 2015 to November 1, 2018) (USDOT, 2018; VDOT, 2019d).

---

[1] Active transportation refers to walking, jogging, biking, or other modes of human-powered transportation.
[2] For the purposes of this study, the Richmond region includes the counties of Chesterfield, Hanover and Henrico; cities of Colonial Heights, Petersburg, and Richmond; and the Town of Ashland.
[3] VDOT's *Pedestrian Safety Action Plan* can be found here: http://www.virginiadot.org/business/resources/VDOT_PSAP_Report_052118_with_Appendix_A_B_C.pdf
[4] Pedalcyclists include bicyclists and other riders of two-wheel, nonmotorized vehicles, tricycles, and unicycles powered solely by pedals; for the purposes of this study, pedalcyclist are hereafter referred to as bicyclists throughout this document.

Table 2-1 lists the pedestrian and bicycle crashes occurring in the study area and statewide for a three-year analysis period. Of the statewide bicycle and pedestrian crashes, approximately 83 percent were pedestrian-related crashes (7,125). Comparatively, within the study area, there have been nearly 800 total pedestrian crashes, which account for 11 percent of the total statewide pedestrian-related crashes. Eight (8) percent of the pedestrian crash incidents in the study area resulted in fatal injury crashes (64), which is double the percentage of pedestrian fatal injury crashes statewide (4 percent). Within the study area, 733 were pedestrian non-fatal injury crashes (92 percent). The City of Richmond had the highest number of pedestrian non-fatal injury crashes (352) followed by Henrico County (182). Henrico County had the highest number of fatal injury crashes (21) followed by the City of Richmond (20).

Table 2-1. Pedestrian and Bicyclist Crashes by Locality and Type (Three Years)

Crash Severity	Locality	Pedestrian	Bicyclist	Total Crashes	% of Total Crashes
Fatal Injury	Chesterfield County	15	0	15	1%
	Hanover County	5	0	5	0%
	Henrico County	21	3	24	2%
	City of Colonial Heights	1	0	1	0%
	City of Petersburg	2	0	2	0%
	City of Richmond	20	3	23	2%
	Town of Ashland	0	0	0	0%
Non-Fatal Injury	Chesterfield County	119	29	148	14%
	Hanover County	32	12	44	4%
	Henrico County	182	71	253	24%
	City of Colonial Heights	6	4	10	1%
	City of Petersburg	39	8	47	4%
	City of Richmond	352	120	472	45%
	Town of Ashland	3	8	11	1%
Total Study Area Fatal Injury Crashes		64	6	70	7%
Total Study Area Non-Fatal Injury Crashes		733	252	985	93%
Total Study Area Crashes		**797**	**258**	**1,055**	**100%**
Statewide Total Fatal Injury Crashes[1]		310	37	347	4%
Statewide Total Non-Fatal Injury Crashes[2]		6,815	1,424	8,239	96%
Statewide Total Crashes		**7,125**	**1,461**	**8,586**	**100%**

[1]*Source: USDOT NHTSA Traffic Safety Facts Virginia 2013-2017 (USDOT, 2018)*

[2]*Source: VDOT TED – Crash Analysis Tool, Version 8.2; November 1, 2015 to November 30, 2018 (February 2019)*

As listed in **Table 2-1**, 1,461 of the statewide pedestrian and bicycle crashes were bicyclist-involved crashes (17 percent), with 37 bicyclist fatal injury crashes (3 percent) and 1,424 bicyclist non-fatal injury crashes (97 percent). Comparatively, in the study area, there have been approximately 258 bicyclist crashes, making up 18 percent of the total statewide bicyclist related crashes. A majority of the bicyclist crashes within the study area were non-fatal injury crashes (98 percent). Within the study area, bicyclist fatal crashes occurred in Henrico County and the City of Richmond, indicating the greater likelihood of motor vehicles and bicyclists interacting in areas of higher population density. According to VDOT's 2004 *Richmond Regional Bicycle and Pedestrian Plan*, people perceive the streets and roads in the Richmond region to be particularly unsafe for

bicycling or walking (VDOT, 2004). The number of pedestrian and bicycle crashes identified within the study area support this perception.

In addition to the detailed analysis of pedestrian and bicycle crash incidents within the study area localities, compared to statewide trends, **Figures 2-1** and **2-2** illustrate the number of fatal and non-fatal pedestrian and bicycle crashes that have occurred per capita. Within the study area, the rate of fatal injury pedestrian and bicycle crashes is 6.8 per 100,000 people, which is higher than the statewide rate (4.1). The non-fatal injury pedestrian and bicycle crash rate per 100,000 people is similar in the study area (95.3) when compared to Virginia (98.5). However, as illustrated in **Figure 2-2**, some study area localities have a noticeably higher rate.

Figure 2-1. Fatal Pedestrian and Bicycle Crashes per 100,000 (Or 100 Thousand) People

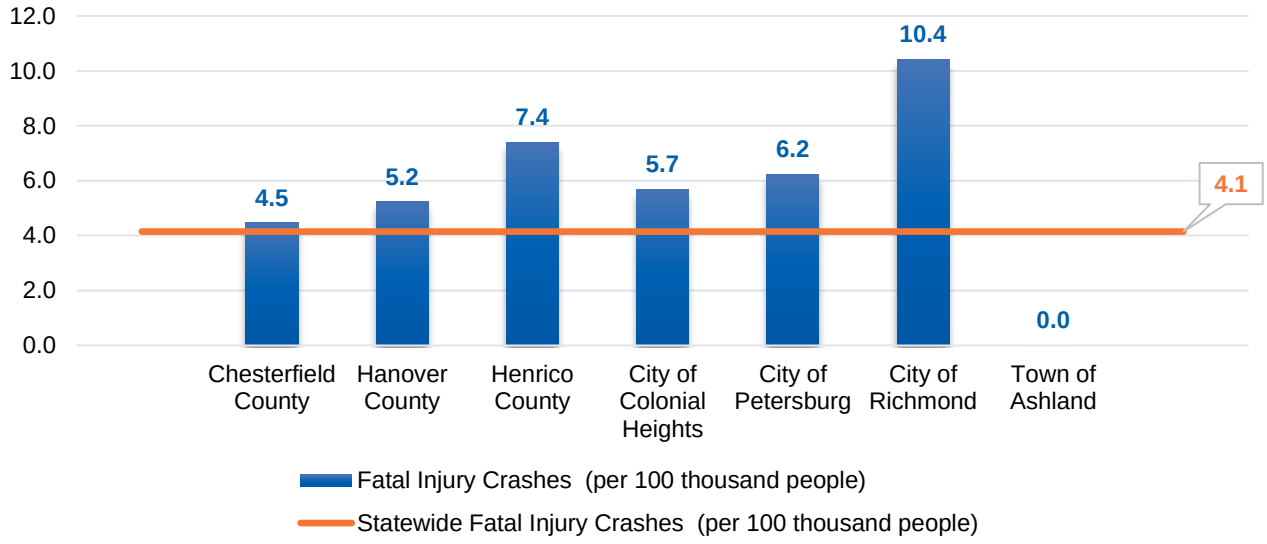
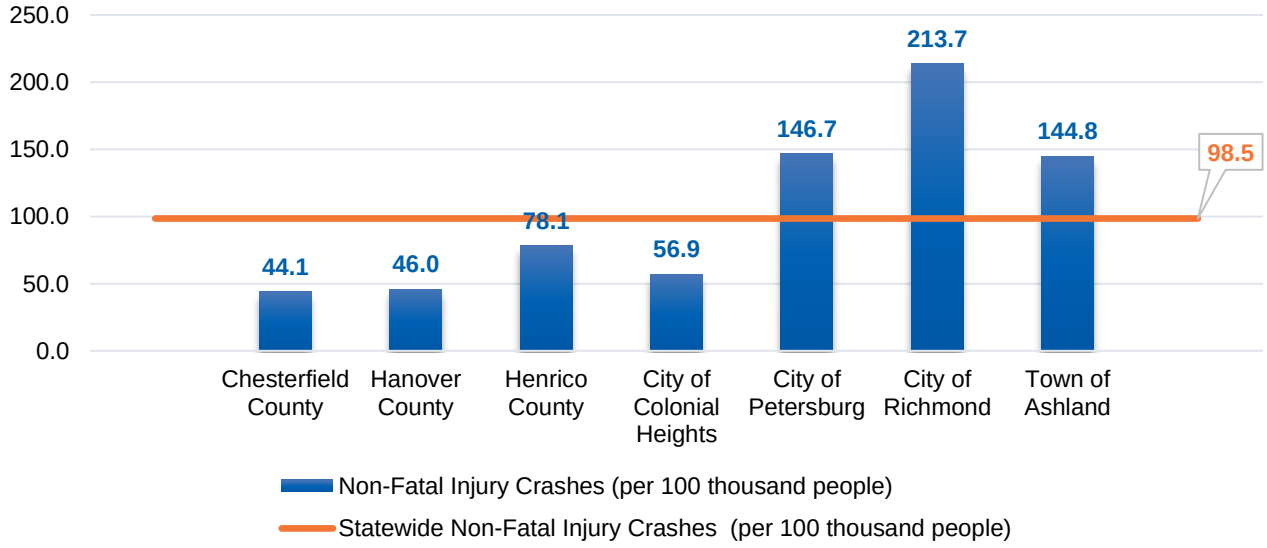


Figure 2-2. Non-Fatal Pedestrian and Bicycle Crashes per 100,000 (Or 100 Thousand) People



The National Association of City Transportation Officials (NACTO) provides guidance and strategies for creating transportation systems that are safe and enjoyable for bicyclists and pedestrians. The NACTO *Designing for All Ages and Abilities* report evaluated the effects of an increase in bikeway lane miles in seven NACTO member cities. The results indicated that bikeway network improvements led to a doubling in ridership and a reduction in the risk of death and serious injury to people biking by one half; indicating that more people bicycle when safe places to ride are available (NACTO, 2017).

According to the Level of Traffic Stress (LTS) rating, separated active transportation facilities provide a low level of stress compared to facilities shared or interacting with roadways. LTS is a rating given to a road segment or crossing indicating the traffic stress it imposes on bicyclists and/or pedestrians (pedestrian LTS related to road crossings) with a range of 1 to 4 (Mineta Transportation Institute, 2012). **Table 2-2** provides a summary of criteria for LTS ratings. The LTS rating indicates that the stress level is significantly less on facilities that are separate from the roadway, LTS 1, and that this facility design consideration allows for additional users of various ages and abilities, including children, to feel more comfortable.

Table 2-2. Level of Traffic Stress Criteria for Active Transportation Facilities

Level of Traffic Stress	Criteria
LTS 1	LTS 1 has a strong separation of the active transportation facility from traffic except low speed and low volume traffic with simple crossings and is suitable for children. LTS 1 bikeways that are physically separated from motor traffic, such as with curbs, raised medians, parking lanes, and flexible bollards, have the lowest level of traffic stress.
LTS 2	LTS 2 includes bicycle and roadway interactions at low speed/low volume traffic situations, however, at higher volumes or speed, people biking have their own place to ride with a physical separation from traffic other than at formal crossings. LTS 2 is typically more suited for adults.
LTS 3	LTS 3 involves bicyclist and roadway interaction with moderate speed or multilane traffic, where users would be classified as “confident.”
LTS 4	LTS 4 involves interaction with higher speed traffic or close proximity to high speed traffic.

Source: Northeastern University, College of Engineering, LTS Criteria Tables (2012). Adapted from Mineta Transportation Institute’s Low Stress Bicycle and Network Connectivity (2012).

In addition to the LTS ratings, according to VDOT Traffic Engineering Division (TED)’s Crash Analysis Tool, a majority of the pedestrian and bicyclist crashes within the study area were located on facilities that are not physically separated from motor traffic (see **Table 2-3**), emphasizing the need for physically separated facilities (LTS 1) to provide safer accommodations for active transportation users and non-motorized traffic. Ninety-eight (98) percent (252) of the bicyclist crashes and 99 percent (793) of the pedestrian crashes in the study area were on non-separated facilities (LTS 3 or 4). There were four pedestrian crashes on a shared use path, all of which occurred at an intersection with a roadway. There were six bicyclist crashes on a shared use path, and all but one occurred at an intersection. Additionally, all six of the bicyclist fatal crashes in the study area were located on shared roadways or non-separated facilities in or near an intersection. There were no crashes on physically separated bicycle lanes in the study area. As bicycle and pedestrian crashes occurred primarily on facilities that were not separated from the roadway, there are significant safety benefits in separating facilities from the roadway. **Appendix A: Location of Pedestrian and Bicycle Crash Incidents** illustrates the location of pedestrian and bicycle crash incidents in the study area.

Table 2-3. Bicyclist and Pedestrian Crashes by Facility Type

Mode of Travel and Facility Type		Crashes	% of Total Crashes	At Roadway Intersection
Pedestrian	None/Other Facility	793	99%	654
	Shared Use Path	4	1%	4
Total Crashes within Localities		**797**	**100%**	**658**
Bicyclist	Shared Roadway	239	93%	214
	Bicycle Lane	13	5%	13
	Physically Separated Bicycle Lane	0	0%	0
	Shared Use Path	6	2%	5
Total Crashes within Localities		**258**	**100%**	**232**

Source: VDOT TED – Crash Analysis Tool, Version 8.2 (February 2019)
Notes: Crashes within 100 feet of designated facilities; Shaded rows indicate physically separated facility

Based on a citizen survey in the Hanover County's 2017 *Bicycle and Pedestrian Citizen Engagement Committee: Final Report*, it was reported that the main reason residents are discouraged from using non-automobile travel was because of unsafe local facilities (Hanover County Planning Department, 2017). Chesterfield County's *Comprehensive Plan* noted that residents indicated that the largest barriers to walking and bicycling was lack of safety on roads and lack of dedicated facilities for walking and bicycling (Chesterfield County, 2019). Based on a review of locality plans, in general, residents are reluctant to utilize non-separated facilities to reach destinations.

The number of bicycle and pedestrian crashes in the study area that have primarily occurred on non-separated facilities suggests a need for improvements and expansion of the separated active transportation facility network. Active transportation facilities that are separate from the roadway, such as shared use paths, are perceived as safer and have the potential to encourage people to utilize active transportation for local and regional trips. Based on a review of LTS ratings, facilities separated from roadways are shown to have lower traffic stress and are more suitable for people of all ages and abilities that want to utilize active transportation. Therefore, there is a need to expand the available infrastructure for active transportation users at a low traffic stress level, in a manner that provides safe separation from motorized transportation uses, ideally LTS 1 or no greater than LTS 2 (if the lowest traffic stress option is not possible due to geographical constraints [e.g., urban setting]). Such separated facilities could include shared use paths, dedicated to non-vehicular modes of travel, including walking and bicycling.

NEED ELEMENT 2: Connectivity

Summary: Active transportation infrastructure facilities that adequately accommodate users of all modes, ages, and abilities are discontinuous and sparse in the study area. As a result, the ability to travel using active transportation modes (i.e., bicycling and walking) may be negatively impacted. In order to increase the rate of bicycling and walking within the study area, and facilitate biking and walking trips in the study area, there is a need to expand and improve the connectivity of the existing active transportation network.

In order to measure active transportation use and connectivity and examine what transportation mode workers choose for travel in the study area, commute mode share can be used. According to the USDOT, the commute mode share measures the percentage of people who commute by different methods, including by bicycle, private vehicle, public transportation or by foot. Commute mode share also reflects how well the infrastructure, policies, and investments support the separate types of travel to work (USDOT, 2016). This measure of the active transportation commute mode share is identified as "journey to work" information collected by the U.S. Census Bureau's American Community Survey (ACS). **Table 2-4** demonstrates the study area mode share of total commuters, in addition to the state and national statistics for commute mode share.

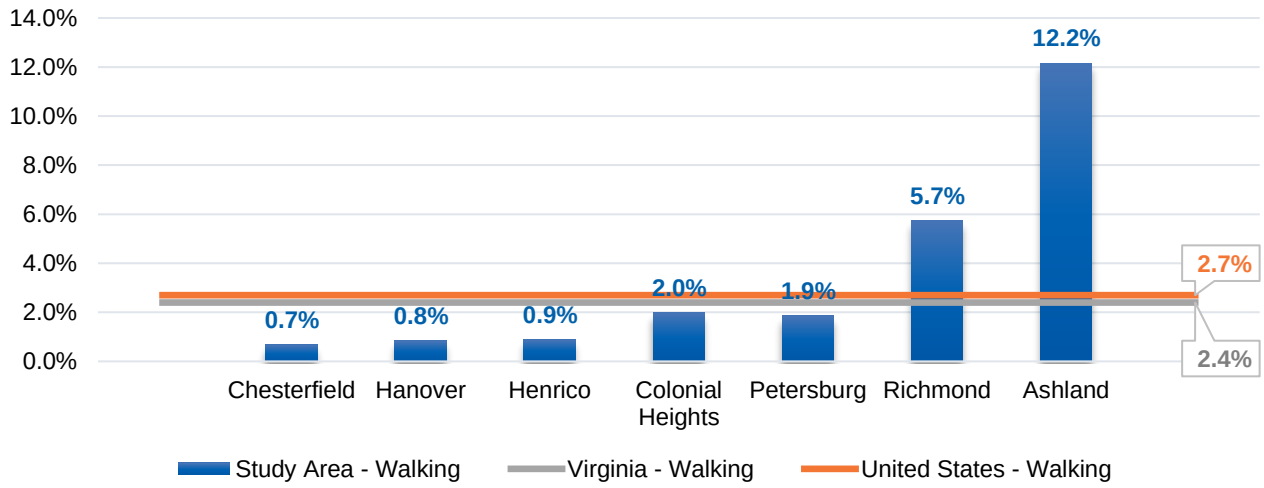
Table 2-4. Commute Mode Share by Study Area, State, and Nation

Commute Mode	Study Area	Virginia	United States
Walking	1.9%	2.4%	2.7%
Bicycling	1.7%	1.7%	1.8%

Source: U.S. Census Bureau (2017). 2013-2017 American Community Survey 5-Year Estimates (Table B08124). Accessed March 2019 https://factfinder.census.gov.
Note: U.S. Census Bureau includes other means, including taxicab and motorcycle, among commute to work by mode counts.

While the study area mode share of total commuters is generally consistent with state and national statistics (see **Table 2-4**), ACS data indicate that the share of active transportation modes in many portions of the study area are noticeably lower, as illustrated in **Figures 2-3** and **2-4**. In Chesterfield, Hanover, and Henrico counties, the portion of the commuting population that walks (0.7%, 0.8%, and 0.9%, respectively) or bikes to work (1.2%, 1.7%, and 0.7%, respectively) is at or below the percentage of commuters at the state (2.4% and 1.7%, respectively) or national level (2.7% and 1.8%, respectively). In the cities of Colonial Heights and Petersburg the share of the commuters that walk to work (2.0% and 1.9%, respectively) is observably lower than in Virginia (2.4%) or the United States (2.7%). In the City of Richmond and the Town of Ashland, the mode share of people who walk (5.7% and 12.2%) or bike to work (3.8% and 4.5%) is relatively high, compared to the mode share of people who walk (2.4% and 2.7%) or bike to work (1.7% and 1.8%) in Virginia and the United States.

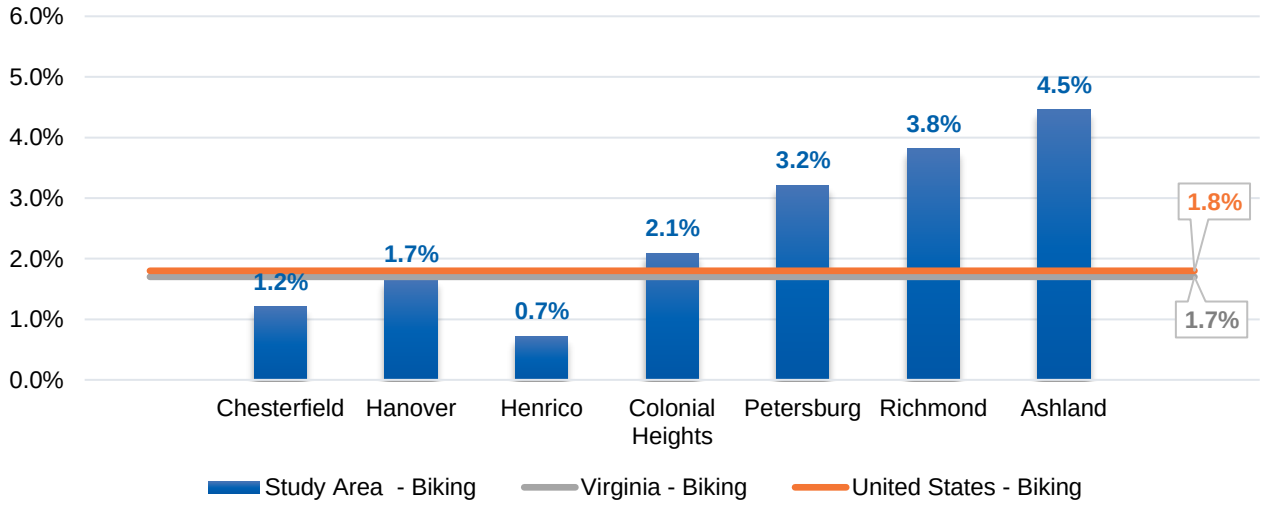
Figure 2-3. Percentage of Commuters Walking to Work



Source: U.S. Census Bureau (2017). 2013-2017 American Community Survey 5-Year Estimates (Table B08124). Accessed March 2019 https://factfinder.census.gov.

Note: Town of Ashland is represented by Census Tracts 3206.01 and 3206.02, which also encompass minimal portions of Hanover County.

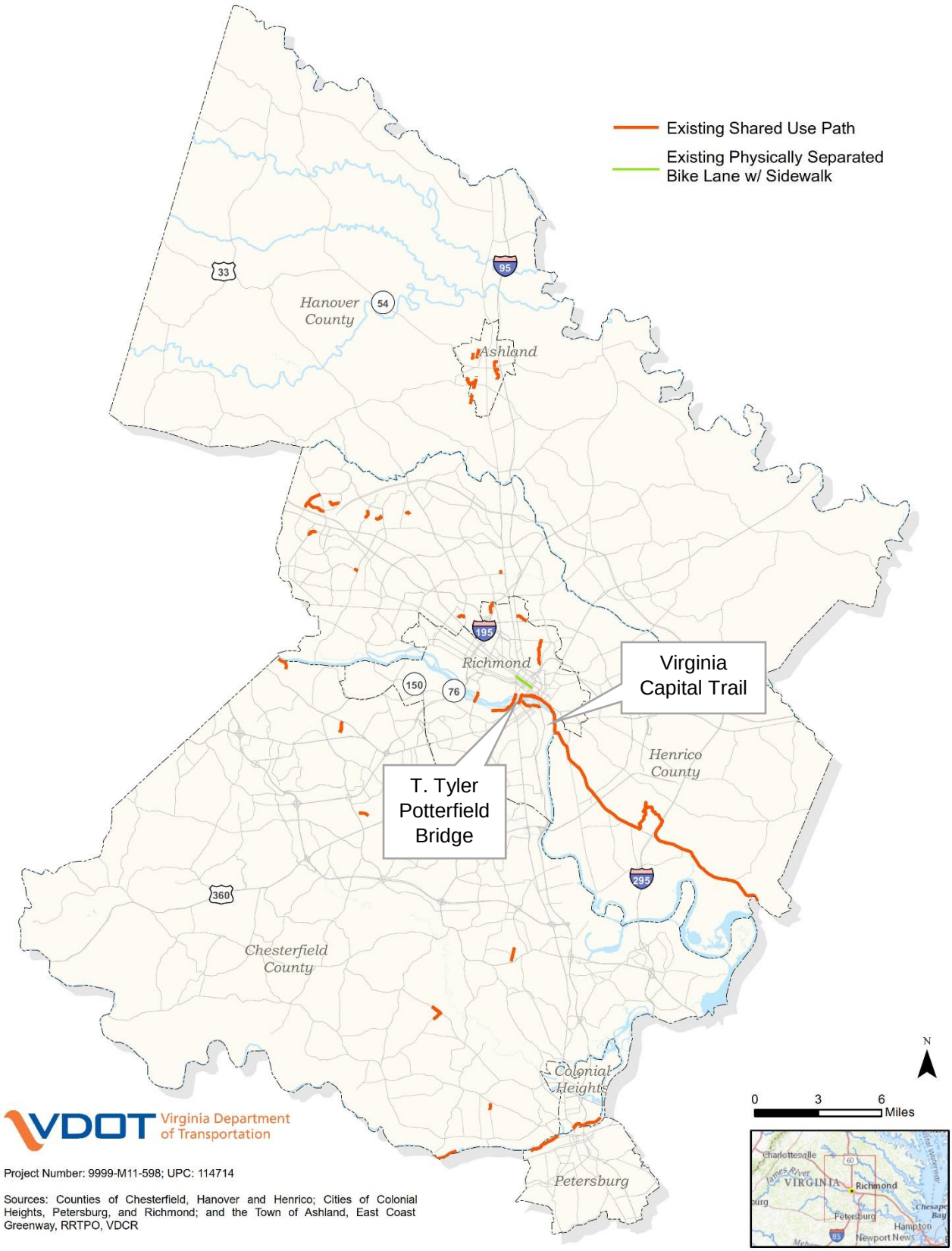
Figure 2-4. Percentage of Commuters Biking to Work



Source: U.S. Census Bureau (2017). 2013-2017 American Community Survey 5-Year Estimates (Table B08124). Accessed March 2019 https://factfinder.census.gov.

Note: Town of Ashland is represented by Census Tracts 3206.01 and 3206.02, which also encompass small portions of Hanover County.

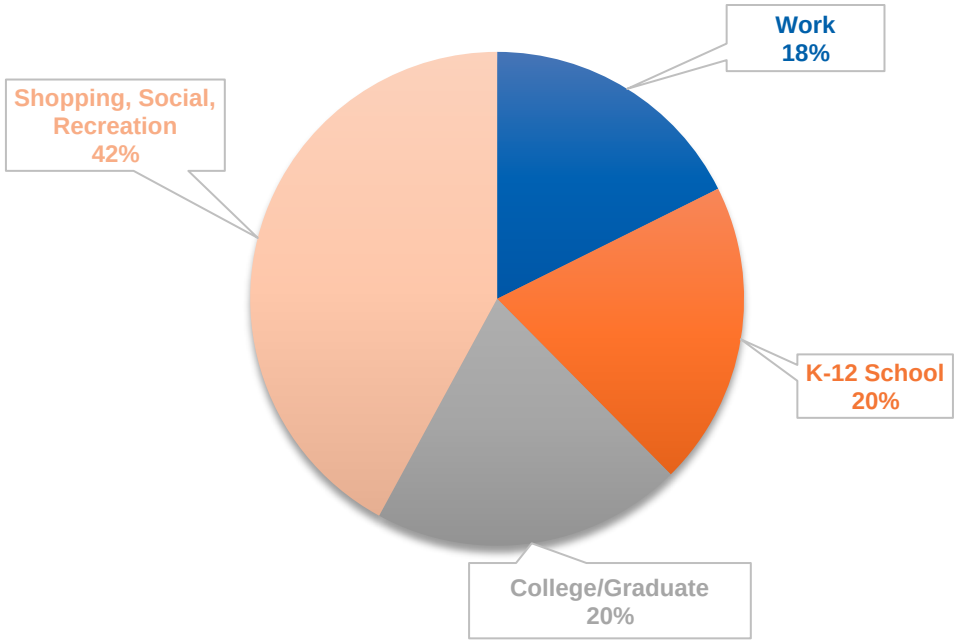
Figure 2-5. Existing Low Stress Active Transportation Facilities in the Study Area



In all localities within the study area, as illustrated on **Figure 2-5,** separated facilities dedicated to accommodating active modes of transportation are generally isolated and involve possible interaction(s) with motorized vehicular traffic. The portion of the commuting population that walks or bikes to work utilize facilities with higher levels of traffic safety. An ideal traffic stress level would be LTS 1 or no greater than LTS 2 (if the lowest traffic stress option is not possible due to geographical constraints [e.g., urban setting]) for all active transportation users in the study area, in a manner that provides safe separation from motorized transportation uses. By providing new or alternate separated or low-stress facilities, the LTS and connectivity would be improved for the portion of the commuting population that walks or bikes between destinations. Additionally, the portion of the commuting population walking or biking may increase.

An indication of walking and bicycling conditions for types of trips within the study area was developed utilizing ACS journey to work, employment, and school enrollment information, and National Household Travel Survey travel characteristics (including trip mode and trip purpose data) (FHWA, 2017). As shown on **Figure 2-6**, the majority of active transportation trips in the study area are for errands, exercise, and leisure (42%), followed by trips to grade schools and colleges/universities (40% combined).

Figure 2-6. Composition of Active Transportation (Walking and Biking) Trips in the Study Area



Sources: U.S. Census Bureau (2017). 2013-2017 American Community Survey 5-Year Estimates (Tables B08124 and S1401). Accessed March 2019 https://factfinder.census.gov.

Federal Highway Administration (2017). National Household Travel Survey (Trip Mode and Generalized Purpose of Trip). Accessed March 2019 http://nhts.ornl.gov

Based on available data, it is difficult to discern whether these trips are made for recreational/discretionary purposes or for utilitarian/nondiscretionary needs, because the same transportation facilities are used for both purposes. However, the American Association of State Highway Transportation Officials (AASHTO) maintains information regarding the characteristics of recreational and utilitarian trips, which can provide guidance on the types of facilities that may

be needed to accommodate certain types of active transportation users, specifically bicycle trips (see **Table 2-5**). Since the majority of bicycling and walking trips within the study area are estimated to be primarily associated with leisure and exercise, AASHTO guidance would suggest that available active transportation infrastructure should support longer trips with connections to varied points of interests and destinations.

Table 2-5. Recreational Trips vs. Utilitarian Trips

Recreational Trips	Utilitarian Trips
Directness of route not as important as visual interest, shade, protection from wind.	Directness of route and connected, continuous facilities more important than visual interest.
Loop trips may be preferred to backtracking; start and end points are often the same.	Trips generally travel from residential to schools, shopping, or work areas and back.
Trips may range from under a mile to over 50 miles.	Trips generally are 1–10 miles in length.
Short-term bicycle parking is needed at recreational sites, parks, trailheads, and other recreational activity centers.	Short-term and long-term bicycle parking is needed at stores, transit stations, schools, and workplaces.
Varied topography may be desired, depending on the fitness and skill level of the bicyclist.	Flat topography is desired.
(Individuals) May be riding in a group.	Often ride alone.
(Individuals) May drive with their bicycles to the starting point of a ride.	Use bicycle as primary transportation mode for the trip; may transfer to public transportation; may or may not have access to a car for the trip.
Typically occur on the weekend or on weekdays before morning commute hours or after evening commute hours.	Some trips occur during morning and evening commute hours (commute to school and work), but in general bicycle commute trips may occur at any hour of the day.

Source: American Association of State and Highway Transportation Officials (2012). Guide for the Development of Bicycle Facilities: Fourth Edition. Washington, DC. p. 2-3

Figure 2-6 shows that approximately 40 percent of bicycling and walking trips within the study area are for school purposes, including students in kindergarten through high school (K-12) (20%) and college/graduate level students (20%). Based on this, the types of active transportation users in the study area, as well as their comfort and skill level, which is often influenced by user age, can be deduced. The AASHTO *Guide for the Development of Bicycle Facilities* states that school-age children (high, middle, or elementary school students) have a wide range of skills and abilities but are often considered to be among the casual and less confident group of active transportation users, especially bicyclists. The casual and less confident group of active transportation users can also include others who enjoy bicycling for recreation as well, but typically only recreate occasionally and utilize paths or low-traffic and/or low-speed streets in favorable conditions. **Table 2-6** provides additional insight on the general characteristics of experienced versus casual active transportation users, particularly bicyclists. According to AASHTO, in order for the casual and less confident group of active transportation users to regularly choose active transportation, a physical network of visible, convenient, and well-designed facilities is needed (AASHTO, 2012). A well-designed separated or low-stress facility required for the casual and less confident group of active transportation users would consist of strong separation of the active transportation facility from traffic except low speed and low volume traffic with physical separations such as curbs, raised medians, parking lanes, and flexible bollards.

Table 2-6. Experienced/Confident vs. Casual/Less Confident Riders

Experienced/Confident	Casual/Less Confident
Most are comfortable riding with vehicles on streets and are able to navigate streets like a motor vehicle, including using the full width of a narrow travel lane when appropriate and using left-turn lanes.	Prefer shared use paths, bicycle boulevards, or bicycle lanes along low-volume, low-speed streets.
While comfortable on most streets, some prefer on-street bicycle lanes, paved shoulders, or shared use paths when available.	May have difficulty gauging traffic and may be unfamiliar with rules of the road as they pertain to bicyclists; may walk bicycle across intersections.
Prefer a more direct route.	May use less direct route to avoid arterials with heavy traffic volumes.
Avoid riding on sidewalks. Ride with the flow of traffic on streets.	If no on-street facility is available, may ride on sidewalks.
May ride at speeds up to 25 mph on level grades, up to 45 mph on steep descents.	May ride at speeds around 8 to 12 mph.
May cycle longer distances.	Cycle shorter distances: 1 to 5 miles is a typical trip distance.

Source: American Association of State and Highway Transportation Officials (2012). Guide for the Development of Bicycle Facilities: Fourth Edition. Washington, DC. p. 2-3

In addition to AASHTO's guidance which recommends careful attention be given to active transportation system characteristics specific to school-aged children, including physical separation of the facility from motor vehicle traffic, Executive Order 13045, *Protection of Children from Environmental Health and Safety Risks*, directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children. Similarly, the USDOT, in collaboration with the Center for Disease Control and Prevention, has established the National Strategies for Advancing Child Pedestrian Safety, which set forth strategies at the national, state and local levels to reduce the risk of childhood pedestrian injury and support modifications of the physical environment to better support pedestrian traffic, especially for children.

There are a variety of bicycle and pedestrian facility treatments that can be implemented to accommodate active transportation users of all ages, abilities, and interests. Active transportation users include non-motorized transportation methods such as bicyclists, wheelchair users and pedestrians including walkers, runners, people with baby strollers, and people walking dogs. Based on the users and the types of trips in the study area, a longer route would accommodate recreational users. However, since the study area also contains riders traveling to schools who are likely casual/less confident users, a separated or low-stress facility would adequately accommodate these users. By incorporating these accommodations in direct routes, there is potential to increase the amount and mode share of active transportation commuters, consistent with usage elsewhere in the state and nationally.

As detailed in VDOT's *Road Design Manual* (RDM), shared use paths offer recreational opportunities, or in some instances, can serve as direct commute routes if interaction and conflicts with motor vehicles and pedestrians are minimized (p. A (11)-10). Shared use paths are typically either within the roadway right of way or within an independent right of way. Since shared use paths are low traffic stress level facilities that are physically separated from motorized vehicular traffic by an open space (buffer) or barrier, shared use paths can accommodate all active

transportation users, including children, and as a longer route, shared use paths can appeal to recreational users. Similar to shared use paths, separated bicycle lanes may be able to accommodate active transportation users of all ages, abilities, and interests in addition to recreational users within the study area. Separated bicycle lanes are exclusive facilities for bicyclists located adjacent to roadways and physically separated from motor vehicle traffic by a vertical element. In combination with a sidewalk facility to accommodate pedestrians, physically separated bicycle lanes can serve as a low traffic stress facility for multiple modes of active transportation. In summary, shared use paths and physically separated bicycle lanes in combination with a sidewalk can best accommodate active transportation users of "all ages and abilities", consistent with the goals established in VDOT's RDM.

As illustrated in **Figure 2-5**, existing, separated shared use paths and physically separated bicycle lanes in the study area are limited and intermittent. Additionally, the majority of the facilities do not connect to existing points of interests, such as schools or places of work and recreation. Of the few that exist within the study area (e.g., Virginia Capital Trail and T. Tyler Potterfield Bridge), pedestrian and bicycle counts are among the highest of all statewide counting sites[5]. Connections to these existing facilities would likely increase the number of active transportation trips and users throughout the study area. Based on the rate of use on existing active transportation facilities and the limited and incongruous network of facilities dedicated to active transportation, connections are needed between existing low traffic stress facilities. Connections would be ideal at points of interest to provide continuous separated active transportation facilities at a low level of traffic stress and to accommodate active transportation trips to points of interest and destinations to school, work, errands, recreation, and other activities that attract these types of transportation users.

NEED ELEMENT 3: Consistency with State, Regional, and Local Transportation Planning

Summary: State, regional and local transportation planning goals support the development of a connected, multimodal transportation system, specifically for active transportation modes such as bicycling and walking.

Statewide, adopted policies and programs emphasize the importance of developing bicycle and pedestrian facilities, in order to provide multiple mode choices, improve mobility and accessibility, and increase safety and comfort for active transportation users. These statewide policies and programs include the 2004 Commonwealth Transportation Board *Policy for Integrating Bicycle and Pedestrian Accommodations* and the 2017 Office of Intermodal Planning and Investment *VTrans2040 – Multimodal Transportation Plan 2025 Needs Assessment*. As part of the development of transportation projects in Virginia, consideration of the feasibility of bicycle and pedestrian facilities is required and projects that incorporate accommodations for these active transportation modes are often prioritized.

Regionally, existing planning efforts identify bicycling and walking as safe, convenient and viable transportation alternatives and recommendations have been made for enhancing bicycle and

[5] VDOT's Statewide Bicycle and Pedestrian Program maintains 30 counters at locations throughout the state. Of the 1,798,563 total counts collected between September 2015 and March 2019, the six count locations in the study area (all on separated bicycle and/or pedestrian facilities) account for over 50% of all count data collected (VDOT, 2019b).

pedestrian options in the Richmond region, as summarized in **Table 2-7**. All of the localities within the study area have stipulations within their comprehensive plans or individual transportation plans that call for bicycle and pedestrian improvements, including recommendations for the implementation of specific projects. For example: utilization of former rail or trolley line corridors for multi-use trail opportunities (i.e. counties of Chesterfield and Hanover, Town of Ashland, and City of Colonial Heights); consideration of major roadways for adjacent dedicated multi-use facilities (i.e. City of Petersburg); recommendation for placement of shared use facilities in proximity to natural features such as stream and river corridors (i.e. counties of Chesterfield and Hanover); and evaluation of demand and supply of existing network conditions and available connections to key destinations such as libraries, parks, schools, or other community facilities (i.e. Henrico County and City of Richmond). **Table 2-7** summarizes the applicable plans and documentation relevant to non-motorized transportation within the Richmond region. As illustrated on **Figure 2-7**, there are a number of planned or desired future shared use facilities in the study area. For the purposes of this study, planned projects include those that are identified for funding and implementation as well as those that have been included in the long-range visioning efforts within the study area. In order to address the demands defined by the extensive transportation planning that has occurred to date in the study area, there is a need to expand the network of existing and planned active transportation infrastructure.

Table 2-7. State, Regional, and Local Active Transportation Planning Summary

Organization	Planning Document / Reference	Date	Details
Statewide			
Commonwealth Transportation Board	*Policy for Integrating Bicycle and Pedestrian Accommodations*	2004	Presumes all highway construction projects shall accommodate bicycling and walking. An accommodation is defined as any facility, design feature, operational change, or maintenance activity that improves the environment in which bicyclists and pedestrians travel. An adopted transportation or related plan is a leading factor to support the need to provide bicycle and pedestrian accommodations on highway construction projects (p.1).
	SMART SCALE Technical Guide	2017	Clarifies that for bicycle and pedestrian projects, accessibility and environmental scoring factors require inclusion of off-road or on-road buffered or clearly delineated facilities (i.e. dedicated bicycle lane or shared use path) in order to qualify for weighting factor points (p. 67-69).
Office of Intermodal Planning and Investment	*VTrans2040 – Multimodal Transportation Plan 2025 Needs Assessment*	2017	Identifies the need for redundancy and mode choice across districts and within VDOT's Richmond District, along the I-64 and I-95 corridors as well as US Route 1, US Route 60/360, and US Route 250 (p. 26).
Virginia Department of Conservation and Recreation	*Virginia Outdoors Plan*	2018	Identifies the need to develop connections to existing county trail systems, including recreational trails and bikeways. Provides the definition for a trail as a linear route on land or water with protected status and public access for recreation or transportation purposes (p. 8.2).

Organization	Planning Document / Reference	Date	Details
Regional			
Tri-Cities Area Metropolitan Planning Organization	*Tri-Cities Area Year 2040 Transportation Plan*	2017	Establishes the goal to make bicycling and walking in the tri-cities area safer by completing a network of sidewalks and trails that allow for trips to employment centers, schools, commercial areas and additional community facilities (p. 25).
	Tri-Cities Area Bikeway Plan Update	2003	Recognizes that bicycling is a safe, convenient and viable transportation alternative and integrates bicycles and walking in the transportation system of the Tri-Cities Urban Area. The plan studies existing bicycling facility conditions and proposes actions to improve the bicycling environments in the Tri-Cities Urban Area in support of the Metropolitan transportation plan. Such improvements could include improved maintenance and upgrading of existing roads that are used regularly by bicyclists, regardless of whether or not bikeways are designated (p. 19).
Richmond Regional Planning District Commission	*Richmond Regional Bicycle and Pedestrian Plan*	2004	Recommends a regional network of roadways, sidewalks, and shared use paths that will serve bicycling and walking needs in the Richmond region, using identified pedestrian nodes and corridors to guide and focus pedestrian improvements and planning in the region. Encourages development of connected routes within the regional network for development as well as bicycle touring routes (p.4.2-4.5).
Local			
Chesterfield County	*Moving Forward – The Comprehensive Plan for Chesterfield County*	2012, amd. 2019	Establishes locality goals to create and maintain a comprehensive, safe and accessible active transportation network that provides alternative mode choices to vehicular transportation and safely provides connectivity to destinations within and outside the County. The encompassed Bikeways and Trails Chapter identifies paved or firmly packed aggregate shared use paths, which accommodate both bicycle and pedestrian users, as the preferred facility for the County based on public input and constituent preferences (p. 155). Within the Bikeways and Trails Chapter, approximately 40 miles of existing active transportation facilities are identified within the County. Additionally, the plan lists eight miles of bicycle and pedestrian projects that are currently under development and recommends 28 miles of improvements to be pursued as additions to the County's active transportation network, desired to be implemented by 2025 (p. 160). The encompassed Northern Jefferson Davis Special Area Plan (adopted 2018) promotes a system of pedestrian and bicycling improvements, including shared use paths, trails, and bikeways, along Jefferson Davis Highway, along adjacent stream corridors and neighborhoods (p. 116 – NJ 7). Additionally, the Bon Air and Ettrick Virginia State University (VSU) Special Area Plans promote bicycle and pedestrian improvements (EV 6; BA 33).

Organization	Planning Document / Reference	Date	Details
Hanover County	*Comprehensive Plan 2017-2037*	2018	Includes an Active Living and Healthy Neighborhood section that acknowledges the benefits of planning and building infrastructure supporting physical activity towards improving quality of life, emotional well-being, and mental health for Hanover's residents (p. 4-1). The Active Living and Healthy Neighborhood section indicates that there are neighborhoods and communities where pedestrian and bicycle connectivity exists; however, there are potential opportunities for connections between various communities. Additionally, the plan calls for regional multi-use trail opportunities to support an established goal for Hanover County to be a community that supports the physical, social and mental well-being of all its citizens to help create vibrant and safe places to live. Towards that goal, the plan calls for the development of an Ashland Trolley Line Trail concept plan and evaluation of a linear park and shared use path that aligns with the Chickahominy River (p. 4-16).
	Bicycle and Pedestrian Citizen Engagement Committee: Final Report	2017	Highlights the desire to enhance pedestrian and bicycle connectivity throughout the County to increase residents' overall health and decrease reliance on automobiles for neighborhood trips and trips to local businesses. As documented in the final report, the committee conducted surveys through which 82.9 percent of the 1,172 respondents suggested they would like to walk, run, and/or bicycle more frequently than they do currently, and 78.4 percent pointed to unsafe facilities making it difficult for them to do so (p. 16-17). The report includes recommendations, which included implementing Complete Streets concepts, developing a County bicycle and pedestrian plan, and called for specific improvement projects (p. 30-33), which served as the impetus for adoption of the Active Living and Healthy Neighborhood section in the County's *Comprehensive Plan*.
Henrico County	*Vision 2026 Comprehensive Plan*	2009	Designates multiples modes or options for transportation, including safe pedestrian and bicycle facilities, as important components to the County's overall transportation network. The plan requires that all new or reconstructed thoroughfares (excluding interstates and access-controlled facilities) include pedestrian accommodations (sidewalks or other pathways), while encouraging consideration of bicycle accommodations on all major road projects where feasible. The Plan recommends the development of a County-wide bicycle plan to identify potential locations for bicycle pedestrian facility connections. The plan also identifies schools, libraries, parks, and other community facilities as key destination points for connections to active transportation (p. 203-204).

Organization	Planning Document / Reference	Date	Details
City of Colonial Heights	*Comprehensive Plan 2044*	2015	Includes a plan objective to provide a network of safe streets, bikeways and walkways that connect neighborhoods with services and improve quality-of-life (p. 10), while acknowledging limited bicycle facilities due to existing constraints (p. 70). The Plan recommends incorporating Complete Streets concepts and creating a City-wide system of bicycle and pedestrian pathways that connect major facilities (schools, parks, recreational facilities, and commercial shopping centers). The Plan suggests utilizing abandoned railroad corridors to the maximum extent for new multi-use trails, with sidewalks and other pedestrian ways to infill connections to existing and proposed trails (p. 79).
City of Petersburg	*Comprehensive Plan*	2014	Highlights the importance of a transportation system that allows for multiple routes and alternative modes of transportation between destinations points. The Plan also suggests dedicated bicycle facilities along major roadways, such as South Crater Road, and pedestrian friendly facilities throughout the City, with emphasis on connections within an approximately 1.5-mile-wide radius of Downtown Petersburg, where pedestrian concentrations are the highest (p. 37).
City of Richmond	*Richmond Connects Strategic Multimodal Transportation Plan*	2013	Envisions a multimodal transportation system to support all modes of travel and improve travel choices for all abilities of users, suggests investment in extended and improved pedestrian facilities, and recommends implementing Complete Streets principles and developing a City-wide bicycling network and Bicycle Master Plan. Identifies specific recommendations and prioritization of bicycle and pedestrian improvements throughout the City (p. 59-60).
	Richmond Bicycle Master Plan	2014	Combines adopted local and regional planning efforts, new analysis, and public engagement to create an up-to-date framework for moving forward with tangible bicycle-related improvements. Includes short-term, mid-term, and long-term network recommendations (p. 3-11-3-18) as well as extensive information on project examples and design guidance. Prescribes facility type selection guidance depending on the location, desired connections, and/or roadway type and traffic volumes (p. 3-6).
Town of Ashland	*Strategic Plan*	2017	Highlights a desire to maintain a safe and effective flow of traffic, focusing on prioritizing funding for infrastructure that adds or expands facilities, including sidewalks, crosswalks, and bicycle paths, that enhance the safety of people driving, walking, and bicycling (p. 17).

Figure 2-7. Existing and Future Planned Low Stress Active Transportation Facilities in the Study Area